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A NEW SUBSPECIES OF MOOSE FROM NORTH AMERICA

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IN the course of recent studies of North American moose with special reference to Ontario, under a research grant from the Carling Conservation Club, it became apparent that the moose from eastern Ontario is not the same race as that of western Ontario. With the eastern race being properly known as *Alces americana americana*, the western form apparently represents a hitherto undescribed race. Mr. G. W. Malaher, Director, Game and Fisheries Branch of the Department of Mines and Natural Resources of the Province of Manitoba, kindly arranged to have a suitable type specimen collected and presented to us. As a tribute to Dr. Rudolph M. Anderson and his contributions to Canadian mammalogy, I take pleasure in proposing that this new subspecies of moose be known as:

Alces americana andersoni subsp. nov.

Type specimen. Adult male (skin and complete skeleton) No. 20068, Royal Ontario Museum of Zoology, collected by Mr. F. R. de Delly on December 18, 1949.

Type locality. Section 27, Township 10, Range 16, Sprucewood Forest Reserve (15 mi. E. Brandon), Manitoba.

Geographical distribution. Northern Michigan and Minnesota, western Ontario, westward to central British Columbia, north to eastern Yukon Territory and Mackenzie Delta, Northwest Territories (see Fig. 1).

Skull characters. Differs from *A. a. americana* in having a greater least width of palate (as measured between the upper toothrows) relative to the length of the upper toothrow crowns. In a series of skulls of 24 middle-aged bulls the least width of palate averaged 38.3 ± 0.46 per cent of the length of the toothrow compared to 35.6 ± 0.56 in 21 similar aged bulls of *A. a. americana* (see Fig. 2A). In similar measurements of cows 16 *A. a. andersoni* specimens averaged 37.7 ± 0.56 compared to 33.7 ± 1.22 for 11 specimens of *A. a. americana*. The new race also differs from

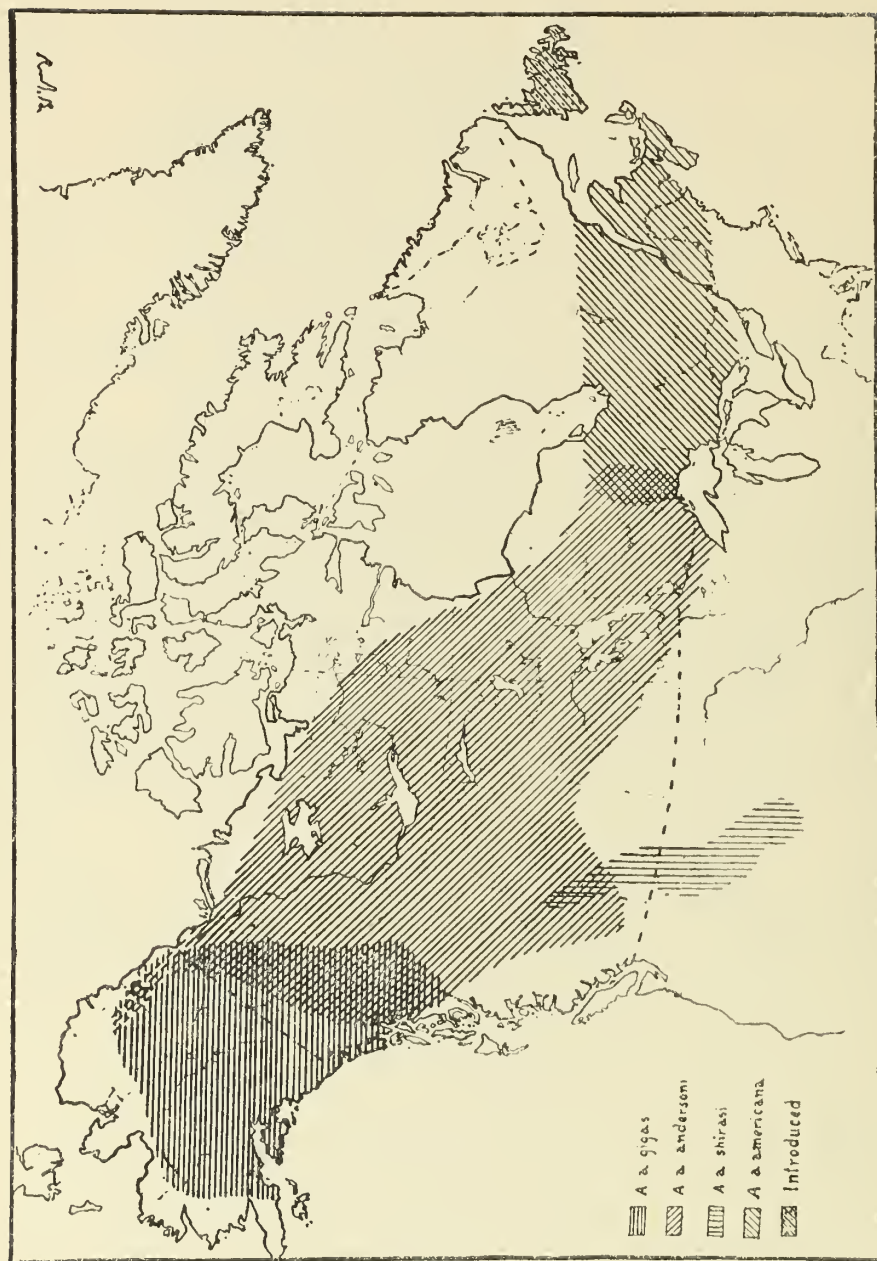


FIG. 1. Distribution of subspecies of *Alces americana* in North America.

the nominate by possessing a relatively higher and narrower occiput (as measured from the inion to the lower lip of the foramen magnum) relative to the mastoid width. A series of 22 middle-aged bulls averaged 76.8 ± 0.77 per cent compared to 73.1 ± 0.63 per cent in 15 males of *A. a. americana*. In 13 cows of the former the average was 81.5 ± 0.71 compared to 76.7 ± 1.02 for 11 of the latter (see Fig. 2B). In bulls the nasal aperture of 25 specimens showed a distinct difference from 23 *A. a. americana* by being more widely flaring, although no significant difference between the cows of these two races was found in this case (see Fig. 2C). In middle-aged cows, however, a distinct difference in the ratio of the mastoid width relative to the greatest zygomatic breadth was found with 13 specimens averaging 73.0 ± 0.76 per cent compared to 76.2 ± 0.65 in 11 skulls of *A. a. americana*. In this character bulls did not appear significantly different. Similarly the cows also differ by having a relatively shorter and wider rostrum when the greatest antorbital breadth is compared with the median palatal length. The former averaged 44.8 ± 0.56 per cent of the palatal length in 15 cows compared to 42.6 ± 0.39 in 11 *A. a. americana* females. In bulls similar measurements were 45.0 and 43.5 per cent respectively, but a slight overlap of this character was noted.

Differs from *A. a. shirasi* in having a narrower and less flaring nasal aperture. In the latter the difference between the greatest inside width of the nasal aperture and the width at the junction of nasals averaged 29.9 ± 0.64 mm. in 10 middle-aged males and 26.3 ± 1.37 mm. in six females of similar age while the corresponding measurement for *A. a. andersoni* was 24.1 ± 0.84 for 25 males and 20.5 ± 1.02 for 16 females. When these measurements are compared to the length of the nasal aperture, a significant difference is found between these two races in this character (Fig. 2C). In bulls *A. a. andersoni* differs from *A. a. shirasi* in having a relatively longer tooththrow, averaging 149.8 ± 0.73 in 24 middle-aged specimens of the former and 142.9 ± 1.38 in 11 of the latter. Further difference is found in bulls in the least width of the palate between the tooththrow relative to the length of upper tooththrow crowns (Fig. 2A) although in both tooth characters overlapping was found in the smaller number of cows examined.

The new race differs from *A. a. gigas* by having a much narrower least width of palate between tooththrows relative to the length of the upper tooththrow crowns (Fig. 2A) and in having a lower occiput as measured from the inion to the lower lip of the foramen magnum. Nine middle-aged adult bulls of the latter averaged 134.1 ± 1.31 mm. while four cows averaged 127.2 ± 1.51 mm. Corresponding measurements of 22 *A. a. andersoni* bulls were 125.2 ± 0.98 mm. while 14 cows averaged 115.1 ± 1.23 mm.

Other characters. *A. a. andersoni* appears intermediate in colour between *A. a. americana* and *A. a. shirasi* with usually more light rufous

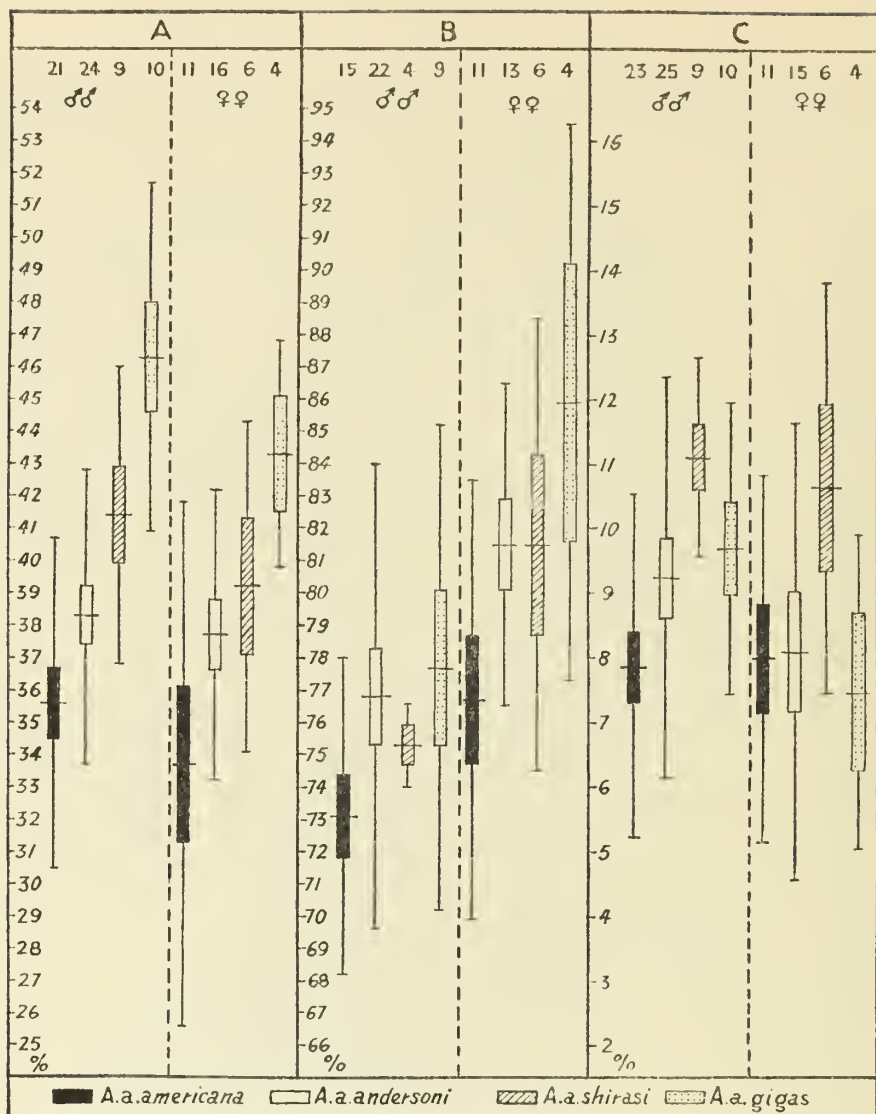


FIG. 2. Variation in skull characters of North American moose. Median horizontal bars represent the mean, the central enclosed areas represent two standard errors ($SE = \frac{S}{\sqrt{N}}$) and the median vertical lines represent two standard deviations on either side of the mean ($S = \sqrt{\frac{\sum x^2}{N - 1}}$). Figures above indicate number of specimens in each sample.

A. Ratio of the least width of the palate (between tooththrows) to the length of upper tooththrow crowns.

B. Ratio of the height of the occiput (inion to the lower lip of the foramen magnum) to the mastoid width.

C. Ratio of the difference between the greatest inside width of the nasal aperture and the width of the aperture at the junction of the nasals, to the length of the nasal aperture.

tones appearing on the head and back region in fall specimens, although much variation is found with the seasons; light area of shoulder hump region usually more extensive than the former and less extensive than the latter. Observations in the field give the impression that *A. a. americana* has a heavier and shorter neck. A check on the cervical vertebrae of one specimen from eastern Ontario and two from western Ontario (all with comparable sized skulls) indicated no significant difference in the length of the centra although in each vertebra the eastern form was consistently the heavier and wider. A further correlation of this condition is suggested in the relatively wider occiput (Fig. 2B) of *A. a. americana*.

Measurements of Type Specimen. The following external measurements were taken in the field by Mr. de Delly according to the author's instructions: Total length, 8 feet $10\frac{3}{4}$ inches; tail vertebrae $3\frac{3}{4}$ inches; hind foot $32\frac{3}{4}$ inches; ear $9\frac{3}{4}$ inches; height at shoulder (top of shoulder to tip of front hoof) 6 feet $3\frac{3}{4}$ inches. Weight, less blood loss, 1060 pounds.

Skull measurements in millimeters are as follows:

Total length—595.

Basal length—532.

Median palatal length—356.

Length of rostrum (anterior rim of orbit to tip of premaxilla)—369.

Length of nasal aperture—276.

Greatest breadth including orbits—238.

Greatest antorbital breadth—161.

Zygomatic breadth—220.

Mastoid breadth—167.

Inion-lower lip foramen magnum—115.

Greatest inside width of nasal aperture—83.

Width of nasal aperture at junction of nasals—60.

Length of upper toothrow crowns—146.

Greatest width of palate including toothrows—153.

Greatest width of palate between toothrows—97.

Least width of palate between toothrows—59.

Mandibular toothrow—159.

Remarks. Lydekker (1907) described a new species of moose from North America which he called *A. columbae*. This description was based on two mounted heads which were supposed to differ from other moose by having a T-shaped, bare muzzle patch. In his original description the animals were said to be from somewhere in British Columbia, but later (Zool. Record, Vol. 44, Mamm., p. 69, and, Lydekker, 1915, p. 236) it was indicated that the type was from Ontario, not British Columbia. The shape of the bare muzzle patch seems quite variable and unsuitable as a diagnostic feature of any known form of American moose. The confusion concerning the locality from which the designated type was taken

makes it impossible to assign, beyond doubt, Lydekker's specimens to any existing form. It becomes necessary to reject *A. columbae* as a valid form on the basis that it is indeterminable from the original description and the name is not available because of the uncertainty of its geographic application.

A. a. andersoni apparently intergrades with *A. a. gigas* in northern British Columbia and southeastern Yukon Territory. Of 12 specimens examined from the vicinity of Teslin lake, Yukon Territory, some appeared referable to *A. a. andersoni*, some to *A. a. gigas* while others possessed mixed or intermediate characters. Intergradation with *A. a. shirasi* seems apparent in southeastern British Columbia and southwestern Alberta and also with *A. a. americana* along the north shore of Lake Superior. In a broader distributional study it has been deduced that *A. a. andersoni* and the nominate race have met north of Lake Superior relatively recently.

Specimens Examined. Acknowledgment with sincere thanks are hereby extended to the following institutions and the personnel in charge who so kindly allowed me free access to specimens in their collections. Abbreviations following each institution are used below to identify material examined.

Academy of Natural Sciences, Philadelphia—A.N.S.P.; American Museum of Natural History—A.M.N.H.; Biological Surveys Collection (U.S. Fish and Wildlife Service)—B.S.C.; British Columbia Provincial Museum—B.C.P.M.; Carnegie Museum—Carn. M.; Chicago Museum of Natural History—C.M.N.H.; Denver Museum of Natural History—D.M.N.H.; Montana State College—M.S.C.; Museum of Comparative Zoology, Harvard University—M.C.Z.; National Museum of Canada—N.M.C.; Royal Ontario Museum of Zoology—R.O.M.Z.; United States National Museum—U.S.N.M.; University of British Columbia—U.B.C.; University of Kansas, Museum of Natural History—U. Kan.; University of Michigan, Museum of Zoology—U. Mich.; University of Montana—U. Mont.; Yellowstone National Park—Y.N.P.

A total of 272 specimens, mostly skulls only, were examined, as follows:

Alaska, 30

A.M.N.H., 11; B.S.C., 6; Carn. M., 2; C.M.N.H., 5; U.S.N.M., 2 (including type specimen); U. Kan., 4.

Alberta, 12

A.M.N.H., 4; Carn. M., 2; N.M.C., 1; U.S.N.M., 1; U.B.C., 3; U. Mich., 1.

British Columbia, 43

A.M.N.H., 4; B.S.C., 4; B.C.P.M., 11; Carn. M., 1; D.M.N.H., 1; U.S.N.M., 2; U.B.C., 15; U. Kan., 5.

Colorado, 1

D.M.N.H., 1.

Idaho, 2

U. Mont., 2.

Maine, 8.
 D.M.N.H., 1; M.C.Z., 6; U.S.N.M., 1.
 Manitoba, 7.
 R.O.M.Z., 2 (including type specimen); U.S.N.M., 5.
 Michigan, 22.
 A.M.N.H., 2; U. Mich., 20.
 Minnesota, 25.
 B.S.C., 1; M.C.Z., 1; U.S.N.M., 1; U. Kan., 22.
 Montana, 7.
 Carn. M., 4; M.S.C., 1; U.S.N.M., 1; U. Mont., 1.
 New Brunswick, 11
 A.M.N.H., 2; B.S.C., 3; Carn. M., 1; N.M.C., 1; U.S.N.M., 4.
 New York, 1
 U.S.N.M., 1.
 Nova Scotia, 11
 B.S.C., 9; M.C.Z., 2.
 Ontario, 43
 A.M.N.H., 1; Carn. M., 1; M.C.Z., 1; R.O.M.Z., 38; U.S.N.M., 2.
 Quebec, 10
 N.M.C., 6; R.O.M.Z., 1; U.S.N.M., 3.
 Saskatchewan, 2
 N.M.C., 2.
 Wyoming, 18
 A.N.S.P., 1; A.M.N.H., 4; B.S.C., 5 (including type specimen); R.O.M.Z., 1;
 U.S.N.M., 2; U. Mich., 1; Y.N.P., 4.
 Yukon Territory, 19
 B.S.C., 3; C.M.N.H., 1; D.M.N.H., 1; N.M.C., 14.

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 1907. The British Columbian moose. *The Field*, Vol. 109, London, p. 182.
 1915. Catalogue of the ungulate mammals in the British Museum (Natural History), Vol. 4, Artiodactyla. *Brit. Mus. Nat. Hist.*, London, pp. 1-432.

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